

Claims

1. A lithographic projection apparatus comprising:
 - a radiation system for supplying a projection beam of radiation;
 - 5 a first object table provided with a mask holder for holding a mask;
 - a second object table provided with a substrate holder for holding a substrate; and
 - a projection system for imaging an irradiated portion of the mask onto a target portion of the substrate, characterised by:
 - 10 a vacuum chamber having a wall enclosing at least one of said first and second object tables, said vacuum chamber wall having an aperture therein;
 - a moveable sealing member for sealing said aperture;
 - a bearing for bearing said sealing member and maintaining a gap between said sealing member and said vacuum chamber wall, said bearing comprising:
 - 15 a gas bearing for providing pressurised gas into said gap thereby to generate forces tending to hold said sealing member away from said vacuum chamber wall; and
 - evacuation means spaced apart from said gas bearing for removing said gas from said gap.
- 20 2. Apparatus according to claim 1 wherein said sealing member comprises a sealing plate moveable parallel to said vacuum chamber wall; and said gas bearing and evacuation means are provided in said vacuum chamber wall to surround said aperture.
- 25 3. A lithographic projection apparatus comprising:
 - a radiation system for supplying a projection beam of radiation;
 - a first object table provided with a mask holder for holding a mask;
 - a second object table provided with a substrate holder for holding a substrate; and
 - 30 a projection system for imaging an irradiated portion of the mask onto a target portion of the substrate, characterised by:

a vacuum chamber having a wall enclosing at least one of said first and second object tables, said one object table being movable;

5 a bearing for displaceably bearing said one object table against a bearing surface within said vacuum chamber and maintaining a gap therebetween, the bearing comprising:

a gas bearing for providing pressurised gas into said gap thereby to generate forces tending to separate said borne and bearing members; and

10 evacuation means spaced apart from said gas bearing for removing gas from said gap, said evacuating means being provided to surround said gas bearing.

4. Apparatus according to claim 1, 2 or 3 further comprising a conduit means providing a fluid communication between said gap and a reservoir at a pressure higher than that of said vacuum chamber and lower than that of said pressurized

15 gas.

5. Apparatus according to claim 4 wherein said conduit means comprises an elongate groove in one surface defining said gap.

20 6. Apparatus according to any one of claims 1 to 5 wherein the distance along said gap between the point of supply of gas to form said gas bearing and said evacuating means is greater than the distance between said evacuating means and an adjacent vacuum chamber.

25 7. Apparatus according to any one of the preceding claims wherein said evacuating means comprises an elongate vacuum groove in one surface defining said gap; a vacuum pump; and vacuum conduits connecting said elongate vacuum groove to said vacuum pump.

30 8. Apparatus according to claim 7 wherein said evacuating means further comprises at least one second elongate vacuum groove generally parallel to said elongate vacuum groove and provided on the other side thereof than said gas

bearing, a second vacuum pump and vacuum conduits connecting said second elongate vacuum groove to said second vacuum pump, said second vacuum pump drawing a deeper vacuum than said vacuum pump.

- 5 9. Apparatus according to any one of the preceding claims wherein said gas bearing comprises an elongate groove in one surface defining said gap; and gas supply conduits for supplying gas under pressure to said elongate groove.
- 10 10. Apparatus according to any one of claims 1 to 8 wherein said gas bearing comprises a plurality of spaced apart indentations in one surface defining said gap, said indentations being filled with porous material; and gas supply conduits for supplying gas under pressure to said indentations.
- 15 11. A method of manufacturing a device using a lithographic projection apparatus comprising:
 - a radiation system for supplying a projection beam of radiation;
 - a first object table provided with a mask holder for holding a mask;
 - a second object table provided with a substrate holder for holding a substrate; and20 a projection system for imaging an irradiated portion of the mask onto a target portion of the substrate, characterised by:
 - a vacuum chamber having a wall enclosing at least one of said first and second object tables, said vacuum chamber wall having an aperture therein;
 - a moveable sealing member for sealing said aperture;25 a bearing for bearing said sealing member and maintaining a gap between said sealing member and said vacuum chamber wall, said bearing comprising:
 - a gas bearing for providing pressurised gas into said gap thereby to generate forces tending to hold said sealing member away from said vacuum chamber wall; and30 evacuation means spaced apart from said gas bearing for removing said gas from said gap; said method comprising the steps of:
 - mounting a mask on said first object table;

mounting a substrate on said second object table; and
exposing said substrate to an image of said mask.

12. A device manufactured according to the method of claim 11.

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13. A vacuum bearing apparatus for displaceably bearing a borne member against
a bearing member and maintaining a gap therebetween, the bearing comprising:

10 forces tending to separate said borne and bearing members; said bearing apparatus
being characterised by:

evacuation means spaced apart from said gas bearing for removing gas from
said gap.

14. Apparatus according to claim 13 wherein said bearing means comprises a
15 vacuum chamber wall defining an aperture therein; said borne member comprises
a sealing member for said aperture; and said evacuating means is provided on the
vacuum side of said gas bearing.

20 15. Apparatus according to claim 13 wherein said bearing member comprises a
wall internal to a vacuum chamber and said borne member comprises a moveable
object within said vacuum chamber; said evacuating means being provided to
surround said gas bearing.